International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2018; 6(5): 66-67

Received: 13-07-2018
Accepted: 15-08-2018

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Genetic variability and heritability studies for cured leaf yield and physiological characters in flue cured Virginia tobacco

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Abstract
The present study was undertaken to study the genetic variability and heritability for physiological traits and cured leaf yield, Two F_2 populations of FCV tobacco were evaluated for physiological traits and cured leaf yield during *Kharif* 2016 in RCBD design with three replications. The obtained results indicated that the phenotypic coefficient of variation was higher than genotypic coefficient of variation for all the characters in both the crosses. However, the differences between them were also narrow indicating the lesser role of environment. high heritability coupled with high genetic advance as per cent mean was observed for the characters cured leaf yield, chlorophyll content, stem girth in F_2 population TB-70 x TB-102 and cured leaf yield, chlorophyll content, specific leaf area, internodal length in F_2 population of cross TB-100 x TB-102. High heritability combined with high genetic adavance indicates that additive gene action play a major role in governing these traits and these traits can be improved by simple selction.

Keywords: Genetic variability, heritability, flue cured Virginia tobacco

Introduction
Tobacco belongs to family solanaceae and genus *Nicotiana*. Two species of Nicotiana (*Nicotiana tabacum rustica* L) are widely grown commercially all over the world. Most of the commercial tobacco produced in the *Nicotiana tabacum*. The only other species used on a limited commercial scale is *N. rustica* (Good speed, 1954) [1]. Among them Flue Cured Virginia (FCV) is exportable and is mainly used in cigarette manufacturing. Some other species such as *Nicotiana sylvestris* and *Nicotiana* grown for ornamental purposes. Along with the above mentioned uses, it is also used for pharmaceuticals and industrial purposes (Taj, 1994) [2]. Variability for different traits in the source population is a prerequisite for crop improvement, since all attempts of breeding and selection would be futile unless major portion of variability is heritable (Mruthunjaya and Mahadevappa, 1995) [3]. The measurement of genetic variation and mode of inheritance of quantitative and qualitative traits are of prime importance in planning the programme efficiently and effectively. Heritability estimates provide information about the extent to which a particular character can be transmitted to the successive generations. Knowledge of heritability of a trait thus guides a plant breeder to predict behavior of succeeding generations and helps in making desirable selections (Cheema *et al*., 2006) [4].

Materials and methods
An experiment for determining genetic variability and heritability for physilogical traits and cured leaf yield of tobacco FCV (*Nicotiana tabacum* L.) was carried out at the College of Agriculture, University of Agricultural and Horticultural Sciences, Navile, Shivamogga during *Kharif* season of 2016. The research was conducted in a randomized complete block (RCB) design with three replications. The experiment was conducted in randomized block design (RBD) with three replications. The entries were planted in rows of 6m length with spacing of 90 x 60 cm and the recommended agronomic practices were followed during the crop growth period. In each F_2 population, seventy five plants were selected at random for recording the observations. Data were recorded characters chlorophyll content, specific leaf weight, stem girth, internodal length and cured leaf yield. Genetic variability was determined on mean performance basis. The analysis was done using the WINDOSTAT software program.

Results and Discussion

Estimates of different statistical and genetical parameters like heritability, genotypic coefficient of variation (GCV), phenotypic coefficient of variation (PCV), heritability and genetic advance as percent mean are presented in Table 1. In the present study, the phenotypic coefficient of variation was higher than genotypic coefficient of variation for all the characters in both the crosses. However, the differences between them were also narrow indicating the lesser role of environment. This is obvious as the material used was F_2 generation of both the crosses.

Table 1: Estimates of components of variability, heritability (broad sense) and genetic advance over mean for cured leaf yield and physiological traits in F_2 population of cross TB-70 x TB-100 and TB-100 x TB-102 in FCV tobacco

Characters	TB -70 X TB -100				TB – 100 X TB - 102			
	GCV	PCV	h^2 (%)	GAM	GCV	PCV	h^2 (%)	GAM
Cured leaf yield (kg/ha)	18.25	22.08	68.34	31.07	17.98	22.04	66.59	30.24
Chlorophyll content	18.30	21.69	71.24	31.84	24.60	26.99	83.09	46.21
Specific leaf weight (mg/cm^2)	13.81	17.93	59.33	21.93	10.82	12.30	77.36	19.62
Stem girth (cm)	11.51	14.13	66.32	19.32	7.30	12.46	34.34	8.82
Internodal length (cm)	13.58	21.10	41.45	18.02	19.78	22.83	75.04	35.31

In the population TB-70 × TB-102, the PCV estimates were relatively high for cured leaf yield and internodal length. Whereas in the population TB-100 × TB-102, high PCV estimates were observed for cured leaf yield, chlorophyll content and internodal length. This indicates higher magnitude of variability present in both the populations.

Moderate values were observed for chlorophyll content, specific leaf weight and stem girth in the population TB-70 × TB-102. Whereas in the population TB-100 × TB-102, moderate values were observed for specific leaf weight and stem girth. None of the characters had low values of PCV in both population.

High GCV was observed for chlorophyll content in the population TB-100 × TB-102. In the population TB-70 × TB-102, moderate GCV values were observed for specific leaf weight, stem girth and internodal length. However, in the population TB-100 × TB-102, moderate values were observed for cured leaf yield and internodal length. Whereas in the population TB-100 × TB-102, low values were observed for specific leaf weight and stem girth. In the population, TB-70 x TB-102, high heritability coupled with high genetic advance as per cent mean was observed for the characters cured leaf yield, chlorophyll content and stem girth. While, specific leaf weight and internodal length exhibited moderate heritability. None of the characters had low heritability.

In the population of TB-100 x TB-102, characters like, cured leaf yield, chlorophyll content, specific leaf area and internodal length recorded the high heritability. Low heritability was noticed by character stem girth. Earlier reports by Dobhal and Nageswara Rao, 1988 [5] and Rao *et al*., 1973 [6] and Rehman and Qureshi, 1997 [7] and Sampurna, 2016 [8] on par with our present study. Improvement of any character in a population depends on the magnitude of variability, heritability and GAM. For this information of genotypic and phenotypic coefficients of variation together with genetic advance as per cent over mean would be useful for improving the efficiency of selection in segregating populations. The presence of genetic variability in breeding material has been emphasized by Falconer (1996) [9] as base for exercising central selection pressure.

References

1. Good speed TH. The genus *Nicotiana*. Chronica Botanica. 1954. pp. xxii+536.
2. Taj FH. Miscellaneous crops. In: Bashir, E. and Robyn, B (Eds) Crop Production. Natl. Book Foundation, 1994.
3. Mruthunjaya CW, Mahadevappa M. Genetic variability, heritability and genetic advance for yield and its contributing characters in ratoon crops rice (*Oryza sativa* L.). Mysore J Agric. Sci. 1995; 29:285-288.
4. Cheema NM, Mian MA, Ihsan M, Rabbani G, Mahmood A. Studies on variability and some genetic parameters in spring wheat. Pak. J Agric. Sci. 2006; 43(1-2):32-35.
5. Dobhal VK, Nageshwara Rao CR. Variability and character associations for certain economic traits in Hookah and chewing tobacco (*Nicotiana rustica* L.). Tob. Res.1988; 14:88-97.
6. 6. Rao CV, Murthy NS, Rao KA. Subramanyam GSV. Appa Rao K. Competition among flue-cured tobacco (*Nicotiana tabacum* L.) genotypes. Crop Improvement. 1973; 9(1):83-86.
7. Rehman RU, Qureshi AA. Estimation of correlation and genetic variability in various tobacco accessions (*Nicotiana tobaccum* L.). Pakisthan. Tob. 1997; 21:17-20.
8. Sampurna D. Genetic investigation in two F_2 populations of flue-cured Virginia (FCV) tobacco (*Nicotiana tabacum* L.). M.Sc (Agri.) Thesis, Univ. Agril. Hort. Sci. 2016, 16.
9. Falconer DS, Mackay TFC. Introduction to Quantitative Genetics, 8th Ed., Longman Group Limited, 1996.